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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR    | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|-------------------------|---------------------|------------------|
| 09/767,154   | 01/23/2001  | Naoyuki Takahashi       | 31721-169084        | 1393             |
| 26694  | 7590        | 03/12/2003              |                     |                  |
| VENABLE, BAETJER, HOWARD AND CIVILETTI, LLP<br>P.O. BOX 34385<br>WASHINGTON, DC 20043-9998 |             |                         | EXAMINER            |                  |
|  |             |                         | SONG, MATTHEW J     |                  |
|  |             | ART UNIT                | PAPER NUMBER        |                  |
|  |             | 1765                    | 12                  |                  |
|  |             | DATE MAILED: 03/12/2003 |                     |                  |

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |                     |
|------------------------------|------------------------|---------------------|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |
|                              | 09/767,154             | TAKAHASHI ET AL.    |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |
|                              | Matthew J Song         | 1765                |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### **Status**

- 1) Responsive to communication(s) filed on 31 December 2002.
- 2a) This action is FINAL.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### **Disposition of Claims**

- 4) Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 3-7 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1,2,8,9,11-15 and 17-20 is/are rejected.
- 7) Claim(s) 10 and 16 is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### **Application Papers**

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.  
 If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

#### **Priority under 35 U.S.C. §§ 119 and 120**

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
 a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### **Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)            | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. . | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 9 recites the limitation "said crystal thin film" in line 2. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2, 8, 13, 14, and 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanaka et al (US 5,879,811).

Tanaka et al discloses a method of forming a thin film comprising an oxide single crystal having a quartz crystal structure, this reads on applicant's epitaxial film, (col 2, ln 10-62) on a single crystal substrate of an oxide, such as quartz, sapphire (col 5, ln 10-20) or a silicon single crystal substrate (Example 7). Tanaka et al also discloses a vapor phase deposition for producing an silicon dioxide thin film having a quartz crystal structure at atmospheric pressure using metal alkoxides, such as, Si(OCH<sub>3</sub>)<sub>4</sub>, Si(OCH<sub>3</sub>)<sub>4</sub> or Si(OC<sub>3</sub>H<sub>7</sub>)<sub>4</sub> (col 7, ln 1-65), where these metal

alkoxides read on applicant's tetramethoxysilane, tetraethoxysilane and tetrapropoxysilane, respectively.

Referring to claim 8 and 19, Tanaka et al teaches a X ray diffraction profile exhibiting a diffraction peak at  $2\theta=50.6^\circ$  in Fig 1, Fig 4 and Fig 5 for quartz.

Referring to claim 13, Tanaka et al teaches a quartz crystal is widely used in an oscillator, a surface acoustic wave device for radio frequency filters, an optical waveguide, a semiconductor substrate, etc. (col 1, ln 10-20).

Referring to claim 13 and 20, Tanaka et al also discloses the quartz crystal is widely used in an oscillator, a surface acoustic wave device for radio frequency filters, an optical waveguide, a semiconductor substrate, etc (col 1, ln 10-20).

Referring to claim 18, Tanaka et al teaches a sapphire substrate (col 5, ln 10-15).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 9, 11-12, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (US 5,879,811) in view of Okano et al (JP 08-110425), an English abstract is provided, or in view of Tokunaga et al (JP 05-215929), an English abstract is provided.

Tanaka et al teaches all of the limitations of claim 9, as discussed previously, except a third layer which is a buffer layer which is disposed between the substrate and the crystal thin film.

In a method of forming a optical wave guide, Okano et al teaches a buffer layer 21 is formed on the surface of a Si substrate and a quartz glass film composed of the same composition as the buffer layer is further form on the quartz film (abstract). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Tanaka et al with Okano et al's quartz buffer because warpage is reduced.

In a method of forming a glass waveguide, Tokunaga et al teaches a buffer layer 2 of quartz is formed on a substrate and a pure quartz film 3 is formed on the buffer layer (abstract). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Tanaka et al with Tokunaga et al's buffer layer of quartz to form a glass waveguide with a small transmission loss.

Referring to claim 11-12, the combination of Tanaka et al and Tokunaga et al or the combination of Tanaka et al and Okano et al teach a quartz buffer layer this reads on applicant's amorphous crystal.

#### ***Allowable Subject Matter***

7. Claims 10 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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8. The following is a statement of reasons for the indication of allowable subject matter: The closest prior art of record is Okano et al (JP 08-110425) and Tokunaga et al (JP 05-215929). The prior does teach a quartz thin film on a buffer layer made of quartz. However, the prior art does not teach or suggest the buffer layer being composed of GaN or ZnO.

***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 703-305-4953. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on 703-308-3868. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Matthew J Song  
Examiner  
Art Unit 1765

MJS  
March 6, 2003

*Benjamin L Utech*  
BENJAMIN L. UTECH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700